



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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APR 01 2011

Ref: 8P-AR

Brian Gustafson, PE
Administrator
Air Quality Program
Department of Environment and Natural Resources
523 East Capitol, Joe Foss Building
Pierre, South Dakota 57501

Re: Comments on Revised Draft Prevention
of Significant Deterioration (PSD) Permit
No. 280701 – Permit to Construct Hyperion
Energy Center

Dear Mr. Gustafson:

The purpose of this letter is to submit the U.S. Environmental Protection Agency's (EPA) comments on the revised draft Prevention of Significant Deterioration (PSD) permit published on South Dakota Department of Natural Resources (DENR) website on February 14, 2011. We appreciate DENR extending the public comment period to April 1, 2011 for all commenters, as we requested in our letter dated March 3, 2011.

This permit action extends the deadline to commence construction of the Hyperion Energy Center (HEC) from February 20, 2011 to August 20, 2012 at Hyperion Refining LLC's request. The proposed HEC will consist of a new 400,000 barrels per day crude oil petroleum refinery and an Integrated Gasification Combined Cycle (IGCC) power plant with gross power output of 532 MW.

EPA commends DENR's effort on its Greenhouse Gas (GHG) Best Available Control Technology (BACT) analysis, which used the recently issued EPA documents titled "Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Petroleum Refining Industry" and "PSD and Title V Permitting Guidance for Greenhouse Gases." Our enclosed comments include a few recommendations for further explanation at step 5 of the analysis for GHG BACT.

We provide these comments to help ensure that the project meets all federal requirements and that the record provides adequate support for the permit decision. Thank you for the opportunity to comment and for continuing to work with EPA on this significant project. If you have any questions, please feel free to contact Carl Daly at (303) 312-6416, or your staff may contact Christopher Ajayi at (303) 312-6320.

Sincerely,

A handwritten signature in cursive script that reads "Deborah Lebow Aal Acting".

Deborah Lebow Aal
Acting Director
Air Program

Enclosures:

1. EPA's comments on the revised draft PSD permit



Enclosure

Hyperion Energy Center Revised Draft PSD Permit Comments from EPA

April 1, 2011

Background

Hyperion Energy Center (HEC) is a proposed 400,000 barrels per day (BPD) crude oil refinery and Integrated Gasification Combined Cycle (IGCC) power plant with nominal gross power output of 532 MW. On August 20, 2009, the South Dakota Board of Minerals and Environment ("the Board") issued a final Prevention of Significant Deterioration (PSD) permit to Hyperion Refining LLC (Hyperion) to construct the HEC near Elk Point, Union County, South Dakota.

On June 23, 2010, Hyperion submitted a request to the South Dakota Department of Environment and Natural Resources (DENR) to extend the construction deadline from February 20, 2011 to August 20, 2012. In addition to reviews of new National Ambient Air Quality Standards (NAAQSs) and inclusion of a coker quench tank, the DENR's revised draft PSD permit includes analyses of BACT for greenhouse gas emissions. The Statement of Basis notes HEC is a major source of GHG emissions with Potential-to-Emit (PTE) of approximately 16.9 million tons per year (tpy) of CO₂e.

Sulfur Recovery Plant: Conditions 3.6(9), 3.8(15) and 5.5

These revised draft permit conditions require a monthly log of the combined number of hours the thermal oxidizers associated with the sulfur recovery operated each month and a 12-month rolling total for the month, which shall not exceed a combined 240 hours of operation during a 12-month period. Consistent with the BACT determination made in the Statement of Basis, these conditions should be more explicit to specify that only one of the two thermal oxidizers would be in operation at any given time and would only operate during startup, shutdown and malfunction (section 3.3, pages 7- 8).

Refinery and IGCC Flares

The Permit, at 12.1, indicates that "the owner or operator shall not flare the gases from the refinery, except during a malfunction." The Statement of Basis clarifies that "the flares used for the refineries may not be operated during normal operation of the facility, including periods of startup and shutdown." Further, the Statement of Basis indicates that refinery flares may be operated during malfunctions. With respect to the IGCC flare limits, we interpret permit condition 13.1 and emission limits to apply during startup, shutdown, and malfunction. However, the Statement of Basis indicates that the intent was only to establish emission limits on the IGCC flare during startup and shutdown.

EPA's position is that the permit should not provide an automatic exemption to emissions standards during malfunctions. EPA's policy is expressed in the EPA's 1999 excess emission policy (Sept. 20, 1999, State Implementation Plans: Policy Regarding Excess Emissions During Malfunctions, Startup, and Shutdown). This policy contemplates enforcement discretion during true malfunctions.

In our November 14, 2008 comments on the then draft permit we recommended that the permit include provisions to incentivize proper operation and maintenance of the facility, consistent with the goal of minimizing malfunction flaring. We noted that the proposed language regarding malfunctions was not sufficiently robust to ensure this goal was achieved. We also indicated that the permit was not sufficiently detailed and it did not specify that the owner/operator had the burden of showing that the event was truly a malfunction. Finally, we recommended an approach to address our concern by including in the permit the criteria from EPA's 1999 excess emissions policy for establishing that an event was a malfunction, and require the source demonstrate that it met the criteria. EPA identified the criteria it recommended to include in the permit in our November 14, 2008 letter. Some, but not all, of the EPA suggested criteria have been included in the draft permit. However, it is still EPA's position that all of the criteria should be included. See items 3, 5, 6, 7, 8, and 10 starting on page 8 of EPA's November 14, 2008 letter.

Furthermore, we note that the permit contains BACT emissions limitations (in Table 13-1) applicable to operation of the IGCC flare during periods of startup and shutdown. However, the permitting record does not appear to contain a justification to establish that these limitations meet BACT requirements. BACT requirements apply at all times, including periods of startup and shutdown. Thus, BACT requirements apply to an emissions unit that functions only during startup and shutdown, and the limitations on this unit must be supported by an explanation in the permit record demonstrating that the applicable limits meet the BACT requirement during these periods.

Conditions 13.1 & 13.4(7) – IGCC Flare Operations & Recordkeeping and Reporting

In discussing EPA's observation that the permit does not include numerical limits associated with the IGCC flares outside of the future flare minimization plan, DENR, in the Statement of Basis at section 6.6 (page 66), disagrees and outlines three requirements it considers numerical limits. One of the requirements states "the flare associated with the integrated gasification combined cycle system may only flare gases that have a sulfur content of 40 parts per million or less (numerical number)." (See page 67). However, this requirement was deleted from the permit condition 13.1. EPA notes that this requirement is important and should be re-instated into the permit because it is a key basis in DENR's discussion in the Statement of Basis. EPA also recommends that condition 13.4(8) be revised to reflect this requirement.

Final VOC BACT Limits for Refinery Process Heaters

EPA notes DENR's discussion in the Statement of Basis at section 6.1 (page 59, last paragraph) where DENR quotes its December 2, 2008 response to comment on page 50 that "In reviewing stack testing data in South Dakota for new boilers burning natural gas, the volatile organic compound as carbon emission rates in pounds per million Btus ranged from 0.0012 to 0.004 pounds per million Btus. It appears the 0.0015 pounds per million Btus limit while burning natural gas is not achievable. In light of the submitted information, DENR agrees the BACT limit for volatile organic compounds for the process heater should 0.005 pounds per million Btus..."

It is still EPA's position that the above response and DENR's proposed conclusion to establish a VOC BACT limit of 0.005 pounds per million Btus does not provide an adequate basis for why it did not establish a VOC BACT limit within the range of 0.0012 to 0.004 Btus, which DENR found for new boilers burning natural gas in the State. EPA continues to recommend that DENR establish BACT limits for VOCs that reflects stack test data. Alternatively, DENR could provide for review and comment on the "submitted information" it relied on, and a basis for proposing the 0.005 pounds per million Btus as the BACT limit.

Documentation of Cost Estimates

The Statement of Basis at section 6.4 (page 62) discusses "detailed cost estimates for refinery process heaters." However, it remains EPA's position that the derivation of costs for the BACT analysis should be fully documented in the permit record. As we explained in our November 14, 2008, comment letter to DENR, generally cost information is provided in the record and can include information from equipment vendors, reference documents, such as EPA's costs manuals. EPA continues to recommend that the permit application and DENR's analyses be revised to include this information for EPA and the public's review.

Tribal Consultation Request from the Winnebago Tribe

EPA is aware of Tribal comments expressed regarding the proposed permit. In addition to responding to letters from the Winnebago Tribe of Nebraska and the Ponca Tribe, we recommend that DENR consult with these Tribes and any other federally recognized tribes that are potentially affected by the action. EPA believes that such consultation would facilitate the exchange of important information among the Tribes and DENR. EPA has conducted an informational session with the Tribes, informed them that DENR is the permitting authority for the HEC facility, and recommended that DENR conduct further Tribal consultation.

Greenhouse Gas (GHG) BACT Analyses

General GHG BACT Observations:

EPA notes that Hyperion's GHG BACT proposal (by its consultant, RTP Environmental

Associates Inc., dated October 18, 2010, referred to below as the “applicant’s analysis”) followed the five-step top-down BACT determination process recommended by EPA’s recently issued PSD and Title V Permitting Guidance for GHGs on EPA website at:

<http://www.epa.gov/nsr/ghgpermitting.html>

This determination process was followed in proposing BACT for each of five refinery systems (acid gas removal system CO₂ vent at the IGCC plant, process heaters, combined cycle gas turbines, small combustion sources, and equipment leaks). EPA also notes that DENR utilized this information in its own BACT analysis in the Statement of Basis for the draft Hyperion permit. DENR also utilized as guidance in its review EPA’s October 2010 document titled “Available and Emerging Technologies for Reducing Green Gas Emissions from the petroleum Refining Industry.”

EPA further notes that there appear to be four key elements of DENR’s approach for establishing the GHG BACT limits in this permit:

a. Establishing GHG BACT emission limits on a system-by-system basis (i.e., process heaters, coke drum steam vents, acid gas removal system CO₂ vent, combustion turbines, small combustion sources, equipment leaks). (Page 44 of DENR’s Statement of Basis)

b. Using a 365-day rolling average for GHG BACT emission limits, rather than a short-term average, given the cumulative, non-localized nature of the environmental concern with GHGs. (Page 44 of DENR’s Statement of Basis)

c. Choosing not to use a single output metric as BACT given the system wide approach for Hyperion’s BACT limits and the ability of the refinery to produce several different products. DENR is instead using a single operational metric based on the crude oil input into the entire facility, i.e., tons of CO₂e emitted per thousand barrels of crude oil processed. (Page 44 in the Statement of Basis)

d. DENR is placing a higher emphasis on reducing emissions of criteria pollutants (PM₁₀, PM_{2.5}, NO_x, SO₂, CO and ozone), which have NAAQS than carbon dioxide. DENR notes that the proposed Hyperion project is “within 90 plus percent” of the 24-hour PM_{2.5} standard, the new 1-hr SO₂ standard, and the new 1-hr NO_x standard, and therefore concluded that “increasing these criteria pollutant emissions is considered a greater risk to an ambient air quality standard than requiring a certain type of BACT for controlling greenhouse gas emissions.” (Pages 39, 40, 41 and 48 in the Statement of Basis)

In order to ensure an adequate record to support DENR’s BACT determination, at step 5 of the BACT analysis, DENR’s Statement of Basis should explain, for each refinery system, how the potential CO₂e emissions and the proposed BACT emission limit were calculated, or cross-reference where this information may be found in the applicant’s analysis. Most importantly, for the acid gas removal system CO₂ vent at the IGCC plant (which accounts for about half of the total CO₂e emissions of 16.9 million tpy from the Hyperion facility), neither DENR’s analysis nor the applicant’s analysis explained how the potential CO₂e emissions and the proposed

BACT emission limit were calculated. This information is necessary to ensure compliance with the BACT criteria in the Clean Air Act and applicable regulations. Our detailed comments on individual refinery systems may be found below.

Comments on section 5.6.1 - Process heaters

DENR should explain, at step 5 of the BACT analysis, how the expected CO₂e emissions from the process heaters (4,852,326 tpy, listed on page 42) were calculated, and how the proposed BACT emission limit of 33.0 tons of CO₂e per 1000 barrels of crude oil processed was calculated. The applicant's analysis (at page 18) indicates that emission calculations were based on CO₂ emission factors, in pounds of CO₂ per million Btu, for various types of fossil fuels, from the Energy Information Administration, at:

<http://www.eia.doe.gov/oiaf/1605/coefficients.html>.

EPA recommends that DENR reference the emission factors from page 18 of the applicant's analysis, as well as the resulting tabulation of CO₂e emissions from individual heaters on page 3 of the applicant's analysis, and explain how use of this information yields a proposed BACT emission limit of 33.0 tons per 1000 barrels.

Comments on section 5.6.2 - Coke Drum Steam Vents

There is no numeric emission limit proposed as BACT at step 5 of the BACT analysis for the Coke Drum Steam Vents. Instead, a design standard is proposed (2 psig, as the allowed maximum pressure of the coke drum steam vents, to minimize direct venting of emissions). We recognize that this design standard follows the approach taken by EPA in promulgating the NSPS subpart Ja standard (which is 5 psig); nevertheless, the definition of BACT in PSD rules at 40 CFR 52.21(b)(12), incorporated by reference into DENR's SIP-approved PSD rules, says that BACT means an "emission limitation" unless "the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emission standard infeasible." Thus, to be consistent with PSD rules DENR must provide an explanation as to why imposition of a numeric emission limit at the coke drum steam vents would be infeasible as BACT.

Comments on section 5.6.3 - Acid Gas Removal System

DENR's analysis does not list, at step 5 of the BACT analysis, the potential CO₂e emissions from this system, nor explain how the emissions were calculated. The applicant's analysis (at page 3) lists 8,549,222 tpy, but also does not explain how the emissions were calculated. Since this is by far the largest single source of CO₂e emissions at Hyperion, accounting for about half of the total CO₂ emissions of 16.9 million tpy, it is especially important that the calculations be described, to support the determination of an appropriate BACT emission limit.